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Charge-Ordering Transitions in (Bi,Ca)MnO(3) and (Bi,Sr)MnO(3) Manganites

V. Kiryukhin, A. Borissov, T.Y. Koo, S-W. Cheong (Rutgers U.), J.P. Hill (BNL)

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$\text{Bi}_{1-x}\text{Ca}_x\text{MnO}_3$ (BCMO) and $\text{Bi}_{1-x}\text{Sr}_x\text{MnO}_3$ (BSMO) exhibit charge ordered phases at low temperatures for $x > 0.5$. In these phases, the charges form one-dimensional stripes separated by charge-depleted regions. We use x-ray diffraction to study the evolution of the striped phases with temperature in BCMO and BSMO for $x = 0.7$. We find that in BSMO the charge-ordering pattern becomes progressively more disordered with increasing temperature. The period of the incommensurate lattice modulation characteristic to the striped state changes with temperature, indicating that discommensurations in the charge-ordering pattern proliferate with increasing temperature. In contrast, the charge-ordered state in BCMO does not show any significant changes at all temperatures at which this state exists. Unlike in BSMO, in which the transition to the charge-ordered state is continuous, the charge-ordering transition in BCMO is first order and occurs at a much lower temperature. The difference in the temperature-dependent behavior of these two materials can be explained by the much lower transition temperature in BCMO and by the abrupt character of this transition.